Ac 169

BECHUANALAND PROTECTORATE.

ANNUAL MEDICAL AND SANITARY REPORT,

FOR THE YEAR 1929.

BUREAU OF HYGIENE & TROPICAL DISEASES
LIBRARY
13 JAN 1931

PRINTED BY
WATERLOW AND SONS LIMITED,
London Wall, London.
1930.

D.O. 3.

Bureau of Tropical Disease

Communications on this subject should be addressed to—

THE UNDER-SECRETARY OF STATE,
DOMINIONS OFFICE,
DOWNING STREET, LONDON, S.W.1,
and the following number quoted:—
11517/3

Subject: Bechuanaland Protectorate, Medical and Sanitary Report. 1929.

Reference to previous correspondence:

Letter ~~to~~ from the Dominions Office of the 21st Nov: 1929.
D 11129/30

Copy Report

Transmitted by direction of the Secretary of State for Dominion Affairs.

A copy has also been sent to the

Dominions Office, Downing Street,
12 June 1931.

(R7077) Wt 7790/2481 20,000(4) 7/30 H & Sp Gp 112

BECHUANALAND PROTECTORATE.

ANNUAL MEDICAL AND SANITARY REPORT,

FOR THE YEAR 1929.

PRINTED BY
WATERLOW AND SONS LIMITED,
London Wall, London.
1930.

Digitized by the Internet Archive
in 2019 with funding from
Wellcome Library

https://archive.org/details/b31475140

BECHUANALAND PROTECTORATE.

ANNUAL MEDICAL AND SANITARY REPORT.

1929.

SECTION I.—ADMINISTRATION.

(*a*) Staff.

European.

Principal Medical Officer.
6 Medical Officers.
2 District Medical Officers (Subsidised).
1 Staff Nurse.
1 Staff Nurse (Part-time).
3 Dispensers.
1 Principal Medical Officer's Clerk.

Native.

1 Dispenser.
4 Hospital Orderlies.

Appointments, Changes, etc., in the Staff.

Donald M. MacRae, C.B.E., M.D., C.M. (Glasgow University), Principal Medical Officer, Mafeking, returned from six months' leave on 25th May, 1929, and retired on 30th September, 1929, on reaching retiring age.

In recognition of Dr. MacRae's valuable services, on 3rd June, 1929, His Majesty the King conferred on him the decoration of Commander of the Order of the British Empire.

Dr. MacRae joined the Administration on the 1st October, 1903, his first appointment being that of Surgeon to the Bechuanaland Protectorate Police. In 1915 he was appointed Principal Medical Officer to the Bechuanaland Protectorate Government and Surgeon-Major to the Police Force. As the first appointed Principal Medical Officer, he has therefore been the pioneer of the Medical Service, and it is entirely due to his efforts that this branch of the Administration has attained its present stage of efficiency. A fact of special interest is that Dr. MacRae, the pioneer of Medical work in the Bechuanaland Protectorate, should have graduated in the same Medical School as the late Dr. Livingstone—the first Medical man to work in this Territory.

13 JAN 1931

Hamilton William Dyke, M.B., Ch.B. (Glasgow University), was appointed Principal Medical Officer on the 1st October, 1929, being transferred from Palestine, where he held the appointment of Surgeon Specialist to the Palestine Government.

Duncan M. MacRae, M.A., M.D., Ch.B. (Glasgow University), relinquished the duties of Acting Principal Medical Officer at Mafeking on the 28th May, 1929, and returned to his appointment of Medical Officer, Francistown.

Henry A. Spencer, M.R.C.S. (Eng.), L.R.C.P. (Lond.), Temporary Medical Officer, Serowe, retired on 14th August, 1929, on termination of his contract.

Alexander Skinner, M.B., Ch.B. (Aberdeen), Medical Officer, Lobatsi, was posted to the Tuli Block on 16th January, 1929.

Austin Morgan, B.A., M.B., B.Ch., B.A.O., Temporary Medical Officer, Francistown, relieving Dr. Duncan M. MacRae, was appointed Medical Officer, Serowe, on 14th August, 1929, vice Dr. H. A. Spencer.

Eleanor Shepheard, M.B., B.S., of the Serowe Medical Mission, relinquished her appointment of Additional Medical Officer, Serowe (Subsidised), on 13th April, 1929.

Albert Arthur Huse, L.R.C.P. & S. (Edin.), L.R.F.P.S. (Glas.), was appointed District Medical Officer, Kanye, on the 1st August, 1929, vice Dr. H. A. Erickson, who resigned on the 22nd July, 1928.

Donald J. D. Henderson, M.B., Ch.B. (Edin.), F.R.C.S. (Edin.), was appointed Medical Officer on 15th December, 1929, and sent to Maun, N'gamiland, to relieve Dr. R. H. Mackintosh, who was taken seriously ill.

Mrs. H. A. Spencer, Temporary Part-time Nursing Sister, Serowe, relinquished her appointment on 14th August, 1929.

Mrs. Page-Wood was appointed Temporary Part-time Nursing Sister, Serowe, from 1st October, 1929, and relinquished the appointment on the 13th January, 1930.

Constance Mitchell, appointed Nursing Sister on the 18th November, 1929, was posted to Gaberones, and transferred to Serowe on the 6th December, 1929.

Distribution of Staff.

The Medical Officers and other details were distributed as follows :—

Mafeking :

Donald M. MacRae, C.B.E., M.D., C.M., Principal Medical Officer until 30th September, 1929.

Hamilton William Dyke, M.B., Ch.B., Principal Medical Officer from 1st October, 1929.

1 Clerk.

1 Native Orderly.

Francistown :

Duncan M. MacRae, M.A., M.D., Ch.B., Medical Officer.
1 European Dispenser.
1 Native Dispenser.

Gaberones :

Desmond Drew, B.A., M.B., Ch.B., Medical Officer.
1 European Dispenser.
1 Native Orderly.

Serowe :

Austin Morgan, B.A., M.B., B.Ch., B.A.O., Medical Officer.
1 Part-time Nursing Sister, Mrs. Page-Wood.
1 Nursing Sister, Miss Constance Mitchell.
1 Native Clerk.

N'gamiland :

Ronald H. Mackintosh, L.R.C.S., L.R.C.P., L.R.F.P. & S., Medical Officer.
1 Native Orderly.

Tuli Block :

Alexander Skinner, M.B., Ch.B., Medical Officer.

Kanye :

Albert A. Huse, L.R.C.P. & S., L.R.F.P.S., District Medical Officer (Subsidised).

Mochudi :

G. M. Malan, M.B., District Medical Officer (Subsidised).

Ghanzi :

European Dispenser.

Molepolole is still served by fortnightly visits paid by the Medical Officer, Gaberones. The intention was to station Dr. Henderson at Molepolole—where there is a very large and important native community—but owing to Dr. Mackintosh having been taken seriously ill in N'gamiland, Dr. Henderson had to be sent to relieve him. Molepolole is thus without a whole-time Medical Officer. It was then proposed to transfer the Medical Officer from Gaberones to Molepolole, but the advisability of this has been questioned owing to the responsibility of Government to the Medical needs of Officials—European and Native—police and prisoners stationed at Gaberones, and of the European farmers, railway employees and the native villages in the Gaberones area. Besides which, a Medical Officer will be required to take charge of the Hospital at Lobatsi, when it is ready to admit patients about July, 1930.

Owing to the vastness of the Protectorate and the wide distribution of Government Officials, European farmers and Native residents, it is quite impossible—with the limited means and personnel available—to supply the justifiable demands of each section of the community, for a Medical Officer to be stationed within comparatively easy access. And in order to provide more or less adequate Medical assistance—especially to the native population—it would be necessary to engage the services of at least four additional Medical Officers, as well as an Officer specially trained in the scientific routine investigation of the diseases prevalent in the Territory, and to erect three new Cottage Hospitals. But, for financial reasons, these proposals cannot at present be entertained.

The resignation of Miss Shepheard (Subsidised Medical Missionary) from Serowe leaves the Medical Officer there single-handed to deal with the Medical needs of a native township of 27,000.

At Chanzi, which is 200 miles distant from the Medical Officer at Maun, there is a Dispenser who administers to the Medical needs of the small European community and natives of the District.

The stationing of a Medical Officer in the Tuli Block has been greatly appreciated by the European farmers residing there, who previously were almost 100 miles from the nearest doctor. And to the large native population living near the Magistracy at Selika, the services of a Medical man are of inestimable value. Difficulties have been experienced in deciding on the site, suitable to erect the Medical Officer's quarters, owing to the water supply. The Magistrate's Reserve at Selika should, without question, be the proper location, but as the water supply there is very brack and unfit for consumption, other sites are being investigated—the factors kept in view being a good water supply on high ground, and proximity to the Native villages, whose population is approximately 10,000. The Medical Officer, during the past year, has invariably had to occupy two rooms of a very indifferent outbuilding on one of the farms, with no Dispensary. His drugs he has kept in a small room which serves as his pantry; his dining room, or the shade of a neighbouring tree, serving as a consulting room—a state of affairs which will be put right as soon as possible in the coming year.

By an arrangement between the South African Railways Sick Fund Authorities and this Administration, the Railway staff on the Section between Mafeking and Bulawayo (both exclusive)—a distance of almost 500 miles—have been attended by two Medical Officers of this Service. This has meant a great deal of travelling, as each Medical Officer has to cover his section once a week, and in order to reduce the time spent on these long journeys, this lengthy section will in future be served by three

Medical Officers, whose stations are on the line, viz. : Principal Medical Officer, Mafeking, Medical Officer, Gaberones, and Medical Officer, Francistown.

(*b*) LIST OF ORDINANCES AFFECTING PUBLIC HEALTH DURING THE YEAR.

High Commissioner's Notice No. 151 of 1928, approving the Regulations and Conditions governing Medical Service in the Bechuanaland Protectorate, published 4th January, 1929.

(*c*) FINANCIAL.

Revenue :—	
Hospital and Dispensary Fees...	£44
Expenditure :—	
Personal Emoluments ...	£6,053
Other Charges ...	4,879
	£10,932

Total Revenue of Protectorate for 1929 ...	£142,246
Total Expenditure of Protectorate for 1929 ...	£143,346
Relation of Medical Expenditure to Total Expenditure	7·06%

The cost of erecting and equipping the new Hospitals at Lobatsi and Serowe is being paid out of Capital Funds and does not appear in the above financial statement, but will be shown in the Annual Report for 1930.

SECTION II.—PUBLIC HEALTH.

The health of the Protectorate during the past year was better than that of 1928, due to Malaria not having assumed the form of a severe epidemic, which it did in that year. With the exception of an extensive outbreak of Measles at Serowe, a small outbreak of Smallpox north of Francistown and some cases of Influenza and Cerebro-spinal Meningitis in N'gamiland, the Territory has been very free of infectious diseases.

Scurvy.

Of the general diseases, the only one that calls for special comment is Scurvy. Though there has been no serious outbreak, 253 cases attended the Dispensaries and indicate the frequency of the condition in most parts of the Territory. The Medical Officer at Maun had 11 cases under his direct observation, with 3 deaths. He reports that the incidence is specially marked when the Makuba from the upper reaches of the Okavango River, who normally eat large quantities of roots and aquatic plants, have to spend any length of time at Maun when they are unable to obtain these plants. The resistance of these Makuba to Scurvy seems to be very definitely deficient as compared with other natives: *e.g.*, Hereros from South-West Africa, who do not develop scorbutic symptoms under the same conditions. At Mochudi the District Medical Officer reports no cases—no doubt because under the progressive influence and guidance of the Acting Paramount Chief of the Bakhatla, the natives grew a certain number of green vegetables which contributed not only to the anti-scorbutic value of the diet, but to the general well-being of the population.

Communicable Diseases.

Syphilis continues to be the disease for which the largest numbers of the natives seek assistance. In view of the very widespread infection of all the tribes in the Protectorate, one would have expected that with the giving of free treatment, large numbers would have presented themselves, but in this—as in other diseases—the local Chief, who exercises great influence, is to a great extent the determining factor by his advice and encouragement to his people to go to the Medical Officer for aid, or not. Injections of Bismuth and Arsenical preparations in conjunction with mixtures containing Mercury form the routine line of treatment. Unfortunately, the dramatic effect of the injections in causing the rapid disappearance of active lesions makes many of the patients cease treatment long before the disease has been eradicated. There being no provision for confirming the diagnosis by means of blood tests, the Medical Officers have to rely entirely on clinical manifestations.

Malaria.

Malaria maintained its seasonal endemic character, being most active in the late summer and autumn months, after the summer rains. Owing to the limited Medical personnel, no systematic malarial survey has yet been made. Where blood examinations have been made—principally at Gaberones and Maun—the Tertian Type (*P. Vivax*) has been the most frequently found. The Subtertian variety (*P. Falciparum*) has been observed in about 10 per cent. of the cases and no case of Quartan came under observation.

The following table, showing the case incidence attending the Dispensaries, gives some indication of the areas most liable to Malarial infection :—

	Cases of Malaria treated.	Percentage of Malaria to total cases treated. Per cent.
Gaberones and Molepolole ...	341	19·47
Francistown	188	7·69
Mochudi	493	11·89
Tuli Block	145	24·35
Serowe...	96	13·41
Maun	60	9·42
Ghanzi...	27	20·15
Kanye	28	1·84
TOTAL	1,378	11·53

These figures, which represent a fraction of the total number of people affected, and who have not sought Medical aid, indicate to some extent the distribution, which is dependent on the summer surface collections of water in the vicinity of the occupied areas. Though Maun shows only 60 attendances for Malaria, the Medical Officer reports that, judging from the splenic enlargements, almost every Native has been affected at one time or another.

Most of the houses occupied by European Officials are, more or less, mosquito proof, and when they have to travel they are supplied with mosquito nets. On all stations where Malaria is prevalent, the Government employees are required to take a prophylactic dose of quinine (grains 5) daily, and by this means the working capacity of the Officials at Gaberones and Maun—where Malaria is probably worse than at any of the other stations—has been maintained ; though the complaint of mild attacks of discomfort and being " off-colour," with very little elevation of temperature, would indicate that there is an infection of which the acute manifestations are suppressed by the taking of these small doses of quinine regularly.

Blackwater Fever.

One case of Blackwater Fever occurred in a European Official, who, to his knowledge, had never had an attack of Malaria. He had regularly taken the prophylactic dose of quinine. He made a rapid recovery on massive alkaline treatment.

Smallpox.

There was a recurrence of Smallpox in the Caprivi Strip (which in the latter part of 1929 was transferred to the South-West Africa Mandatory Administration). A Medical Officer, who was sent to investigate and deal with the outbreak, reported 302 cases, most of which had occurred prior to his investigations. The disease was mild in character, conforming more to Alastrim than to Variola. Sixteen deaths occurred in the affected area. No cases occurred in the neighbouring portions of the Bechuanaland Protectorate proper.

During the months of from April to August there were outbreaks in villages north of Francistown (Ramaquabane and Tsessebe). 123 cases were reported with 16 deaths. With the enforcement of quarantine measures and vaccination of contacts, the outbreak was stamped out. During the latter part of the year, individual cases occurred at Sass Post and Mahalapye, but prompt measures smothered the spread.

Cerebro-spinal Meningitis.

In N'gamiland a considerable and widespread number of cases of this disease occurred. The Medical Officer at Maun personally dealt with 14 cases, 13 of whom died. Apart from these, several other deaths in outlying villages were reported. From evidence collected it would appear that the disease has existed for some years in a more or less endemic character, and either it was not brought to the notice of the Authorities, or—if it were—it was not recognised as such. Probably the former conjecture is correct, due to the activities of the native "doctors," who have been known definitely to oppose and prevent people from seeking the advice of the European doctors. The distribution has been such that the Medical Officer in charge of that area is of opinion that the illness follows the trade route from the Zambesi, through Kachikau and Maun to Tsau, and the surrounding areas. Propaganda among the Chiefs has been widely resorted to and it is hoped that the Natives will report early cases and take the advice necessary to prevent a spread.

Influenza.

Most of the cases reported occurred sporadically. The only locality where it took an epidemic form was in N'gamiland in July last. 128 cases occurred in Maun and the surrounding villages—all of a mild character and no deaths resulted.

Plague.

No cases have occurred in the Protectorate, but in view of the widespread distribution throughout the Union of South Africa and from reports of surveys made by the Health Department of the Union, that rodent infection occurs along the Union borders of the south-west corner of the Protectorate ; and as there are no geographical or other barriers to prevent the spread of infection to the veldt rodents of the Protectorate, vigilance is maintained, and two Rodent Inspectors continually patrol the south-western borders, investigating any abnormal number of deaths among these animals, keeping in touch with the European and Native inhabitants, obtaining information regarding rodent mortality, and keeping the population alive to the urgent necessity of reporting any abnormal disease or death-rate among the rodents. Each of these Inspectors has made 5 to 6 complete tours of the area allotted to him, and has rendered monthly reports of his investigations to the Medical Officer at Gaberones, who attended a special course of instruction in anti-Plague measures under the Union Department of Health. During the year there was no evidence of rodent infection in the Territory.

For the first time, as far as can be ascertained, the following two infectious diseases have made their appearance in the Bechuanaland Protectorate :—

Relapsing Fever.

One case occurred in December at Molepolole. It was confirmed by microscopic examination. The source of infection could not be ascertained.

Bilharzia (*Schistosomiasis*).

One case is reported from Mochudi, 5 from Lobatsi and 20 from Kanye. The condition is known to be widespread in South Africa, but this appears, to be the first time it has been observed in this Territory. All the cases were seen in December and the source of infection has not yet been determined.

Owing to the difficulty in keeping in close touch with the large native population living remote from the District Officers, no records are kept of births and deaths, and therefore no data are available from which to draw up vital statistics.

The health of the European community and officials has compared favourably with that of other years and calls for no special remarks. Owing to lack of suitable hospital arrangements in the Protectorate, most of the Officials requiring special nursing or surgical attention were treated in Hospitals in Mafeking, Livingstone, Bulawayo and Johannesburg. But when the Hospitals at Serowe and Lobatsi have commenced to function there will no longer be the necessity for sending these cases to outside Hospitals, and this will prove a great financial benefit to the Administration and patients themselves.

SECTION III.—HYGIENE AND SANITATION.

The most serious problems with regard to the general health of the population are efficient water supplies and anti-Malarial measures.

Water Supplies.

At most of the Government stations and in the native towns and villages this essential commodity of life is very inadequate. Most of the water supplies are wells sunk in the lowlying valleys. Many of these are through a stratum of lime and other mineral salts and the water from them is brackish and unpleasant. The average native well is from 30 to 80 feet deep, from which the water is drawn up by a bucket attached to a cord. This, in the late winter and spring, constitutes the only source of water for domestic purposes and for watering cattle—a laborious effort which militates against the native population maintaining normal cleanliness of themselves and their clothing, and makes it impossible for them to grow vegetables. A very serious aspect of these wells is that the underground water level appears to be receding and each year 3 or 4 more feet have to be added to the depth of the wells. The proposed use of Government drills for water boring throughout the Protectorate should in time go far towards enabling the native population to have a reasonable supply of water for domestic and other purposes.

The sanitary arrangements for European inhabitants are primitive but effective, consisting of the bucket earth closet. The " Wembley " bucket system instituted at Francistown and one or two other stations is proving most satisfactory and might in time prove so efficient and hygienic as to replace entirely the ordinary bucket system, which, if not properly carried out, very easily becomes a source of nuisance and possible danger where flies are prevalent.

Native sanitation is of the most primitive. Except for three or four earth pit closets erected at Serowe by the Chief, the neighbouring bush or donga supplies all their requirements. At their cattle posts and in sparsely occupied areas this system, though not ideal, is efficient owing to the action of the sun's rays and scavenging animals and insects ; but in large townships such as Serowe, where houses are built in close proximity over an area of 2 or 3 miles in each direction, the situation is distinctly unpleasant—if not dangerous. Fortunately, up to the present, water-borne diseases—like the Enteric Group—have been conspicuous by their absence. During the year 1929 only one case of Typhoid Fever was reported for the whole Protectorate. This fortunate state of affairs is probably a matter of chance and one cannot count on its continuance ; and the intention of the Administration is to investigate ways and means to provide for a more hygienic state of affairs in the native townships.

Courses in hygiene and elementary Physiology are given to the upper classes at the National School at Mochudi. Taken as a whole the standard of living of the Bechuanaland native is below that of most of the native tribes of South Africa. No doubt Malaria is an important contributing factor.

One of the Medical Officers says of the natives in his district, "The majority of the people are rotten with infection (Malaria) and chronic Malarial pains are a common complaint." Can one wonder that with such a physical disability and its resultant mental lethargy they make only such efforts as will supply them with the absolute bare necessities of life—this in turn lowering their resistance to Malaria when it comes their way ? With the exception of the Bakhatla, the class of houses the natives occupy are mostly mere hovels, badly covered with grass and quite incapable of being rendered mosquito proof. However, with the example of a few of the most progressive of the race who have taken up dairy farming and who are making a very profitable living, and with the elevating effect of education at the Mission and other schools, it is hoped that in time they will make greater efforts to raise their standard of living and thus be able to withstand infection when it comes.

The one outstanding exception to this low standard of living is the Bakhatla tribe. Under the progressive influence of Chief Isang and the excellent work done among the tribe by the Dutch Reformed Church Missionaries, including a Medical Missionary and trained European Nurse, one finds a totally different state of affairs from most of the other natives in the Protectorate. Their houses, which are well built and roofed, are mostly enclosed by a wall 4 feet high. These enclosures are clean and tidy and the surroundings are free from the litter and refuse that are usual accompaniments of native villages. Successful attempts are made to grow vegetables—and the Chief, at the principal villages, has established a good water supply from boreholes for the use of the communities. The Chief makes periodic inspections of dwellings and their surroundings, and insists on a high standard of maintenance and hygiene. The result is reflected in the general appearance of wellbeing and prosperity of this tribe, notwithstanding the fact that Malaria is very prevalent in that area.

As regards Malaria, Bechuanaland stands even in a worse position than Rhodesia and the affected parts of the Union of South Africa in respect of the knowledge of its Anopheles and their habits ; but for financial reasons it has not been possible to employ the necessarily highly trained investigators. At present only two of the Medical Officers are supplied with microscopes. It is hoped that arrangements can be made to afford the Medical Officers facilities for obtaining an elementary training in Malariology so that they may be in a position to make a survey of the splenic and parasitic indices, and thus ascertain the extent to which the population is affected.

The question of dealing with Malaria by systematically freeing the breeding places of Anopheles from larvae cannot be contemplated at present in a country whose inhabitants are so widely scattered, until more information has been obtained regarding the species which convey the disease and their particular habits. Except for a few mosquitoes collected on a farm in the Tuli Block and classified by Dr. Ingram of the South African Institute for Medical Research in 1927, when he made a survey of mosquitoes in the Northern Transvaal, no scientific investigation has been made in the Protectorate and our knowledge of this subject—as well as that of other disease-carrying insects in the Territory—is exceptionally limited ; and until experienced observers can be employed we will have to rely on the information obtained from the work of others in the neighbouring Colonies and apply it as far as we can to the needs of this country. This is unfortunate, as Bechuanaland offers exceptionally favourable conditions for observing mosquito life. The writer, and one of the Medical Officers, have—in the course of their other duties—made certain cursory observations with regard to larvae in surface collections of water, which indicate the need for systematic investigations. Such investigations, however, to be of real value, must be carried out by trained Medical entemologists, but—as has been stated—the financial resources of the country do not permit of this being contemplated at present, such funds as are available for the Medical Service being inadequate to meet the immediate needs of the sick and afflicted.

SECTION IV.—HOSPITALS AND DISPENSARIES.

Gaberones, Francistown and Serowe temporary Hospitals continued to function as heretofore—supplying such medical and surgical assistance to the natives as could be given with limited nursing facilities in unsuitable buildings. The new Hospital at Serowe is complete and was officially opened by His Excellency the Earl of Athlone on the 5th October, 1929, and will be ready to function as soon as the water supply is installed. It comprises male and female native wards of 12 beds, and with the verandah space available it will be capable of accommodating 20 natives. Besides this, there are 5 single wards for Europeans. There is a good operating theatre, and it is hoped, during the next year, to erect a small X-ray plant. It will be staffed by 2 European Nursing Sisters and Native Nurses, male and female. The original idea of attending to the Outpatients in the Hospital building itself has been abandoned and until an Outpatient building has been constructed, the old Dispensary will continue to serve for Outpatients.

The Southern Hospital is in course of construction at Lobatsi. The foundation stone was laid by His Excellency the Earl of Athlone on the 7th October, 1929. It is identical in plan with that of the Serowe Hospital and will be staffed on the same scale. A separate Outpatient building will be constructed 100 yards from the Hospital building. The water supply for the Lobatsi Hospital—which should be amply sufficient for all purposes—is obtained from a bore hole 400 yards away. As Lobatsi is on the main railway line, the Hospital should supply the needs of a very extensive area.

Both Hospitals will have electric light installations and sewage will be water-borne with septic tanks.

H. F. DYKE.

Principal Medical Officer.

APPENDIX I.

Out Patients for the year 1929.

DISPENSARIES.

Diseases by Systems or Groups.	Nos.	Principal Diseases.	Nos.	Remarks.
I. Epidemic, Endemic and Infectious Diseases.	5,200	1. Enteric Fever	1	
		3. Relapsing Fever	1	
		5. Malaria ...	1,373	✓
		Blackwater ...	1	
		7. Measles ...	54	
		9. Whooping Cough	28	
		11. Influenza ...	250	
		13. Mumps ...	7	
		16. Dysentery ...	34	
		Amœbic ...	1	
		20. Leprosy ...	4	
		24. Cerebro-spinal Meningitis ...	14	
		25. Other Epidemic Diseases :		
		Varicella ...	35	
		G. Yaws ...	1	
		31. Tuberculosis, Pulmonary and Pharyngeal ...	37	
		35. Tuberculosis of the Bones and Joints ...	30	
		37. Tuberculosis ...	278	
		38. Syphilis :		
		(*a*) Primary ...	58	
		(*b*) Secondary ...	404	
		(*c*) Tertiary ...	1,354	✓
		(*d*) Hereditary	72	
		(*e*) Period not indicated ...	991	
		39. Soft Chancre ...	1	
		40. (*a*) Gonorrhœa and its complications ...	166	
		(*b*) Gonorrhœal Ophthalmia ...	4	
		41. Septicæmia ...	1	
Carried forward ...	5,200		5,200	

Appendix I—*continued.*

Out Patients for the year 1929. Dispensaries—*continued.*

Diseases by Systems or Groups.	Nos.	Principal Diseases.	Nos.	Remarks.
Brought forward...	5,200		5,200	
II. General Diseases not mentioned above.	896	44. Cancer or other malignant Tumours of the Stomach or Liver ...	7	
		45. Cancer of the Intestines ...	2	
		46. Cancer of the Uterus ...	11	
		48. Cancer of the Skin	4	
		50. Tumours, non-malignant ...	75	
		51. Acute Rheumatism	153	
		52. Chronic Rheumatism ...	209	
		Lumbago ...	22	
		53. Scurvy ...	253	
		58. Anæmia ...	59	
		Debility ...	71	
		60. Diseases of the Thyroid : Goitre ...	10	
		66. Alcoholism ...	20	
III. Affections of the Nervous System and Organs of the Senses.	1,320	71. Meningitis (not including Tuberculous Meningitis or Cerebro-spinal Meningitis) ...	2	
		75. Paralysis ...	15	
		77. Other forms of Mental Aberration	300	
		78. Epilepsy ...	11	
		80. Infantile Convulsions ...	1	
		82. (a) Hysteria ...	3	
		(b) Neuritis ...	85	
Carried forward ...	7,416		6,513	

APPENDIX I—*continued.*

Out Patients for the year 1929. Dispensaries—*continued.*

Diseases by Systems or Groups.	Nos.	Principal Diseases.	Nos.	Remarks.
Brought forward...	7,416		6,513	
III. AFFECTIONS OF THE NERVOUS SYSTEM AND ORGANS OF THE SENSES—(*contd.*)		(c) Neurasthenia	8	
		Neuralgia ...	2	
		Insomnia ...	2	
		84. Other Affections of the Nervous System such as Paralysis Agitans	14	
		85. Affections of the Organs of Vision :		
		(*b*) Conjunctivitis	426	
		(*c*) Trachoma ...	85	
		(*d*) Tumours of the eye ...	2	
		(*e*) Other Affections of the Eye	155	
		86. Affections of the Ear or Mastoid Sinus	209	
IV. AFFECTIONS OF THE CIRCULATORY SYSTEM.	171	90. Other Affections of the heart :		
		(*a*) Valvular—		
		Mitral ...	66	
		Aortic ...	44	
		91. Diseases of the Arteries :		
		(*a*) Aneurism ...	1	
		(*b*) Anterio-Sclerosis ...	1	
		93. Diseases of the Veins :		
		Hæmorrhoids ...	4	
		Varicose Veins	14	
		94. Diseases of the Lymphatic System :		
		Lymphadenitis...	41	
Carried forward ...	7,587		7,587	

Appendix I—*continued.*

Out Patients for the year 1929. Dispensaries—*continued.*

Diseases by Systems or Groups.	Nos.	Principal Diseases.	Nos.	Remarks.
Brought forward ...	7,587		7,587	
V. Affections of the Respiratory System.	2,508	97. Diseases of the Nasal Passages :		
		Polypus ...	3	
		Rhinitis ...	3	
		Coryza ...	3	
		Epistaxis ...	16	
		98. Affections of the Larynx :		
		Laryngitis ...	13	
		99. Bronchitis :		
		(*a*) Acute ...	373	
		(*b*) Chronic ...	169	
		(*c*) Bronchial Catarrh ...	1,804	
		100. Broncho-Pneumonia ...	16	
		101. Pneumonia, Lobar ...	51	
		102. Pleurisy, Empyema ...	34	
		105. Asthma ...	19	
		107. Silicosis ...	4	
VI. Diseases of the Digestive System.	3,399	108. (A) Diseases of the Teeth and Gums :		
		Caries ...	267	
		Pyorrhœa ...	232	
		(B) Other Affections of the Mouth :		
		Stomatitis ...	115	
		Glossitis ...	3	
		Thrush ...	1	
		109. Affections of the Pharynx or Tonsils :		
		Tonsilitis ...	188	
		Pharyngitis ...	62	
Carried forward ...	13,494		10,963	

APPENDIX I—*continued.*

Out Patients for the year 1929. Dispensaries—*continued.*

Diseases by Systems or Groups.	Nos.	Principal Diseases.	Nos.	Remarks.
Brought forward	13,494		10,963	
VI. DISEASES OF THE DIGESTIVE SYSTEM.—(*contd*).		112. Other Affections of the Stomach :		
		Gastritis ...	70	
		Dyspepsia ...	653	
		113. Diarrhœa, Enteritis under 2 years ...	170	
		114. Diarrhœa, Enteritis over 2 years ...	213	
		114. (A) Colitis ...	16	
		Colic ...	1	
		116. Diseases due to Intestinal Parasites :		
		Cestoda (Tænia) ...	12	
		Ascaris ...	2	
		Oxyuris ...	5	
		117. Appendicitis ...	9	
		118. Hernia ...	3	
		119. Other Affections of the Intestines :		
		Enteroptosis...	2	
		Constipation...	1,325	
		123. Biliary Calculus	1	
		124. Other Affections of the Liver...	49	
VII. DISEASES OF THE GENITO-URINARY SYSTEM (NON-VENEREAL).	525	129. Chronic Nephritis ...	61	
		130. (B) Schistosomiasis ...	26	
Carried forward ...	14,019		13,581	

APPENDIX I—*continued.*

Out Patients for the year 1929. Dispensaries—*continued.*

Diseases by Systems or Groups.	Nos.	Principal Diseases.	Nos.	Remarks.
Brought forward ...	14,019		13,581	
VII. DISEASES OF THE GENITO-URINARY SYSTEM (NON-VENEREAL)—(*contd.*)		133. Diseases of the Bladder : Cyatitis ...	26	
		134. Diseases of the Urethra : (*a*) Stricture...	4	
		(*b*) Retention of Urine ...	31	
		135. Diseases of the Prostate : Prostatitis ...	4	
		136. Diseases (Non-Venereal) of the Genital Organs of Man : Orchitis ...	1	
		Phomosis ...	6	
		138. Salpingitis ...	7	
		140. Uterine Hæmorrhage (Non-Puerperal) ...	5	
		141. Other Affections of the Female Genital Organs : Amenorrhœa	21	
		Dysmenorrhœa	86	
		Menorrhagia	125	
		Leucorrhœa ...	62	
		Retroversion Uterus ...	33	
		142. Diseases of the Breast (Non-Puerperal) : Mastitis ...	26	
		Abscess ...	1	
VIII. PUERPERAL STATE.	174	143. (A) Normal Labour ...	66	
		Protracted Labour ...	7	
Carried forward ...	14,193		14,092	

APPENDIX I—*continued.*

Out Patients for the year 1929. Dispensaries—*continued.*

Diseases by Systems or Groups.	Nos.	Principal Diseases.	Nos.	Remarks.
Brought forward	14,193		14,092	
VIII. PUERPERAL STATE.—(*contd.*)		(B) Accidents of Pregnancy :		
		Abortion ...	13	
		Ruptured Perinea ...	2	
		Other Accidents of Pregnancy ...	86	
IX. AFFECTIONS OF SKIN AND CELLULAR TISSUES.	712	152. Boils and Carbuncles ...	47	
		153. Abscess ...	137	
		Whitlow ...	25	
		Cellulitis ...	10	
		154. (A) Tinea ...	7	
		(B) Scabies ...	19	
		155. Other Diseases of the Skin :		
		Urticaria ...	16	
		Eczema ...	95	
		Herpes ...	13	
		Ulcers ...	82	
		Impetigo ...	108	
		Acne	141	
		Warts ...	8	
		Corns ...	2	
		Elephantiasis	2	
X. DISEASES OF THE BONES AND ORGANS OF LOCOMOTION (other than Tuberculous).	90	156. Diseases of the Bones :		
		Osteitis ...	7	
		157. Diseases of the Joints :		
		Arthritis ...	25	
		Synovitis ...	58	
XI. MALFORMATIONS.	3	159. Malformations	3	
XII. DISEASES OF INFANCY.		160.		
XIII. AFFECTIONS OF OLD AGE.	36	164. Senility ...	36	
Carried forward ...	15,034		15,034	

APPENDIX I—*continued.*

Out Patients for the year 1929. Dispensaries—*continued.*

Diseases by Systems or Groups.	Nos.	Principal Diseases.	Nos.	Remarks.
Brought forward ...	15,034		15,034	
XIV. AFFECTIONS PRODUCED BY EXTERNAL CAUSES.	2,016	169. Suicide by Drowning ...	1	
		176. Attacks by Poisonous Animals : Insect Bites ...	23	
		177. Other Accidental Poisonings	5	
		178. Burns by Fire and Scalds ...	189	
		183. Wounds by Firearms ...	53	
		184. WOUNDS by Cutting or Stabbing Instruments ...	368	
		Septic Wounds	175	
		Contused Wounds ...	116	
		Incised Wounds	283	
		Lacerations ...	196	
		196. Wounds in Mines or Quarries	8	
		189. Wounds inflicted by Animals, Bites, Kicks, etc.	38	
		201. (A) Dislocations	3	
		(B) Sprains ...	59	
		(C) Fractures	90	
		205. Diseases not already specified or ill-defined : Headaches ...	374	
		Accidents ...	27	
		Malingering ...	8	
TOTAL ...	17,050		17,050	

APPENDIX II.

RETURN OF DISEASES AND DEATHS—IN PATIENTS—FOR THE YEAR 1929.

Diseases.	Remaining in Hospital 1929.	Yearly total.		Total cases treated.	Remaining in Hospital 1930.
		Admissions.	Deaths.		
I.—EPIDEMIC, ENDEMIC AND INFECTIOUS DISEASES.					
5. Malaria	—	12	—	12	—
Rheumatism ...	—	2	—	2	—
7. Measles	—	1	—	1	—
11. Influenza	—	5	—	5	—
25. Yaws	—	1	—	1	—
27. Anthrax	—	1	1	1	—
31. Tuberculosis, Pulmonary ...	—	1	—	1	—
35. Tuberculosis of Bones and Joints ...	—	1	—	1	—
38. Syphilis :					
(*b*) Secondary ...	—	6	—	6	—
(*c*) Tertiary ...	—	15	—	15	—
(*e*) Period not indicated ...	—	2	1	2	—
40. Gonorrhœa and its complications ...	—	11	—	11	—
50. Tumours, Non-malignant	—	5	—	5	—
II.—GENERAL DISEASES NOT MENTIONED ABOVE.					
51. Acute Rheumatism	—	1	—	1	—
52. Chronic Rheumatism	—	1	—	1	—
53. Scurvy	—	1	—	1	1
69. Other general diseases Purpura Hæmorrhagica	—	1	—	1	—
Carried forward ...	—	67	2	67	1

APPENDIX II—*continued.*

Return of Diseases and Deaths—In Patients—for the Year 1929—*continued.*

Diseases.	Remaining in Hospital 1929.	Yearly total		Total cases treated.	Remaining in Hospital 1930.
		Admissions.	Deaths.		
Brought forward ...	—	67	2	67	1
III.—AFFECTIONS OF THE NERVOUS SYSTEM AND ORGANS OF THE SENSES.					
71. Meningitis (not including Tuberculous Meningitis or Cerebro-spinal Meningitis)	—	1	—	1	—
75. Paralysis : Hemiplegia ...	—	1	—	1	—
76. General Paralysis of the Insane ...	—	2	1	2	1
77. Other forms of mental aberration ...	—	3	—	3	—
78. Epilepsy	—	1	—	1	—
85. Affections of the Organs of vision ...	—	1	—	1	—
IV.—AFFECTIONS OF THE CIRCULATORY SYSTEM.					
88. Acute Endocarditis or Myocarditis ...	—	2	1	2	1
90. Other Diseases of the Heart : Mitral	—	1	—	1	—
91. Diseases of the Arteries : Arterio-Sclerosis ...	—	1	—	1	—
Carried forward ...	—	80	4	80	3

APPENDIX II—*continued.*

Return of Diseases and Deaths—In Patients—for the year 1929—*continued.*

Diseases.	Remaining in Hospital 1929.	Yearly total		Total cases treated.	Remaining in Hospital 1930.
		Admissions.	Deaths.		
Brought forward ...	—	80	4	80	3
V.—AFFECTIONS OF THE RESPIRATORY SYSTEM.					
99. Bronchitis	—	6	2	6	—
101. Pneumonia :					
Lobar	1	1	1	2	—
102. Pleurisy, Empyema	—	4	—	4	—
VI.—DISEASES OF THE DIGESTIVE SYSTEM.					
108. Affections of the Mouth :					
Stomatitis ...	—	1	—	1	—
109. Affections of the Pharynx or Tonsils :					
Tonsilitis ...	—	1	—	1	—
114. Diarrhœa and Enteritis :					
2 Years and over	—	3	—	3	—
Cyst Abdominal Walls ...	—	1	—	1	—
124. Affections of the Liver :					
Hepatitis... ...	—	2	—	2	1
VII.—DISEASES OF THE GENITO-URINARY SYSTEM (NON-VENEREAL).					
128. Acute Nephritis ...	—	1	—	1	1
Carried forward ...	1	100	7	101	5

APPENDIX II—*continued.*

Return of Diseases and Deaths—In Patients—for the year 1929—*continued.*

Diseases.	Remaining in Hospital 1929.	Yearly total.		Total cases treated.	Remaining in Hospital 1930.
		Admissions.	Deaths.		
Brought forward ...	1	100	7	101	5
VII—DISEASES OF THE GENITO-URINARY SYSTEM (NON VENEREAL) (*continued*).					
133. Diseases of the Bladder :					
Cystitis ...	—	1	—	1	—
138. Salpingitis ...	—	1	—	1	—
141. Other Affections of the Female Genital Organs :					
Uterine Catarrh	—	6	—	6	—
VIII.—PUERPERAL STATE.					
IX.—AFFECTIONS OF THE SKIN AND CELLUULAR TISSUES.					
153. Ulcers and Abscess	—	3	—	3	—
155. Other Diseases of the Skin :					
Eczema ...	—	4	—	4	—
X.—DISEASES OF BONES AND ORGANS OF LOCOMOTION (other than Tuberculosis).					
157. Diseases of the Joints :					
Synovitis ...	—	2	—	2	—
XI.—MALFORMATIONS.					
Carried forward ...	1	117	7	118	5

Appendix II—*continued.*

Return of Diseases and Deaths—In Patients—for the year 1929—*continued.*

Diseases.	Remaining in Hospital 1929.	Yearly total.		Total cases treated.	Remaining in Hospital 1930.
		Admissions.	Deaths.		
Brought forward ...	1	117	7	118	5
XII.—DISEASES OF INFANCY.					
XIII.—AFFECTIONS OF OLD AGE.					
XIV.—AFFECTIONS PRODUCED BY EXTERNAL CAUSES.					
176. Attacks by Poisonous Animals :					
Snake Bite ...	—	1	—	1	—
177. Other Accidental poisonings... ...	—	3	—	3	—
178. Burns by Fire and Scalds	—	6	—	6	—
183. Wounds by Firearms	—	3	2	3	—
184. Wounds by Cutting or Stabbing Instruments	—	1	—	1	—
Lacerations ...	—	15	—	15	—
185. Wounds by Fall ...	—	5	—	5	—
188. Railway Accidents	1	1	—	2	—
201. Fractures	—	4	—	4	—
TOTAL	2	156	9	158	5

APPENDIX III.

VOTE 8.—MEDICAL.

Vote and Sub-Heads.	Estimates.	Actual Expenditure.	More than Estimated.	Less than Estimated.	Remarks.
	£	£ s. d.	£ s. d.	£ s. d.	
Personal Emoluments	6,195	6,053 1 0	—	141 19 0	Saving of part of undrawn pay of Principal Medical Officer, while on vacation leave and of fees of Medical Officers.
Equipment, Drugs, Instruments, Stores, etc.	1,400	1,427 7 8	27 7 8	—	Equipment of temporary hospital at Serowe which was not contemplated when the Estimates were framed.
Maintenance of Destitutes and Lunatics, Vaccination, etc.	700	903 4 1	203 4 1	—	Additional destitutes requiring assistance and lunatics maintained in Union asylums.
Hospital Expenses, etc. ...	300	589 15 8	289 15 8	—	Opening of temporary hospital, Serowe, and expenses of specialists' treatment authorized by the High Commissioner during the year.
Grant, Victoria Hospital, Mafeking.	25	25 0 0	—	—	—
Travelling Expenses ...	600	1,333 6 3	733 6 3	—	Heavy costs incurred in changing Dispensers at Ghanzi and increased motoring on duty by Medical Officers.
Preventive measures against the introduction of Plague.	—	600 17 10	600 17 10	—	Payment of Salaries and equipment of two Rodent Inspectors for portion of the year approved by High Commissioner's despatch No. 1530, dated 28/8/28.*
	9,220	10,932 12 6	1,854 11 6	141 19 0	

* Not sent to S. of S.

BECHUANALAND PROTECTORATE

1929—1930.	April.		May.		June.		July.		August.	
	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
Ghanzi	86.36	54.26	77.67	48.35	54.33	42.86	51.61	39.45	55.14	42.23
Ngamiland	70.23	61.56	66.38	50.83	61.13	45.00	59.77	43.83	59.75	45.46
Kasane	86.75	55.99	84.32	52.24	80.68	47.54	79.74	46.75	82.26	50.29
Francistown	81.30	60.37	80.74	55.26	75.77	51.60	76.72	51.96	73.61	56.23
Serowe	80.27	49.20	81.16	45.68	71.16	40.47	72.26	38.03	74.32	40.13
Selika	82.43	53.76	81.77	47.93	74.90	44.60	74.61	40.52	75.64	46.13
Gaberones	83.13	48.13	80.84	42.68	72.46	40.96	74.68	36.06	74.64	39.81
Kanye	77.85	51.88	75.00	51.35	66.30	46.36	66.77	43.53	68.58	45.90
Lobatsi	80.43	48.27	77.41	43.89	68.93	38.83	69.96	36.09	71.65	40.16
Molepolole	81.94	53.26	79.65	48.19	71.44	44.02	70.66	41.18	—	43.06
Palapye Road	83.57	49.87	80.54	54.44	74.06	37.06	74.32	35.51	68.77	43.61
Total	894.26	586.55	865.48	540.84	771.16	479.30	771.10	452.91	704.36	493.01
Average	81.30	53.32	78.68	49.17	70.11	43.57	70.10	41.17	70.44	44.82

TEMPERATURE RETURNS 1929–30.

SEPTEMBER.		OCTOBER.		NOVEMBER.		DECEMBER.		JANUARY.		FEBRUARY.		MARCH.	
Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.	Max.	Min.
—	57.53	91.68	64.94	91.70	65.63	88.45	65.65	89.74	70.19	90.39	69.64	83.84	64.61
—	54.62	—	65.45	—	64.97	—	64.91	—	65.35	—	64.75	80.61	61.74
94.88	61.63	98.07	68.96	92.59	68.07	85.26	64.75	87.16	65.58	89.44	64.89	85.28	63.75
89.23	70.47	93.26	72.90	91.53	68.03	85.77	62.61	87.00	65.26	88.89	66.21	84.42	64.61
86.53	53.43	91.45	57.84	88.47	62.87	83.61	61.42	85.51	60.87	85.25	60.04	82.68	58.48
86.83	62.23	90.06	67.52	90.13	67.33	87.16	66.71	88.64	66.16	89.46	65.89	84.00	62.23
86.40	56.80	91.48	63.68	89.60	63.56	87.42	62.39	88.36	63.06	89.11	61.25	84.68	58.19
79.18	57.58	85.27	61.42	83.67	61.87	81.27	61.32	82.24	61.66	83.59	61.84	79.84	58.03
81.23	54.07	88.16	60.45	87.50	60.60	84.58	60.19	84.90	61.23	85.11	56.96	82.52	53.43
87.86	56.69	90.38	62.94	90.83	63.33	86.29	62.23	88.29	63.35	88.54	62.46	84.58	58.74
87.80	55.33	90.42	62.19	89.40	65.27	86.99	63.81	86.40	64.19	89.32	62.71	84.55	61.65
779.94	640.38	910.23	708.29	895.42	711.53	856.80	696.02	868.27	706.90	879.10	696.64	917.00	665.46
86.66	58.22	91.02	64.39	89.54	64.68	85.68	63.27	86.83	64.26	87.91	63.33	83.36	60.50

RAINFALL—1929-30.

1929.	Ghanzi.	Ngamiland.	Kasane.	Francistown	Serowe	Selika.	Gaberones.	Kanye.	Lobatsi.	Molepolole.	Palapye Rd.
April	.07	.12	.03	.28	.06	.71	.73	.83	1.07	1.00	.13
May	.07	—	.02	.10	.09	.24	.13	.65	.28	.12	.04
June	—	—	—	.04	—	—	1.72	1.93	.55	.03	—
July	—	—	—	—	—	—	—	—	.02	—	—
August	.01	—	—	—	—	—	.14	.11	—	—	—
September	.22	.05	—	—	.23	.86	.27	.95	1.56	.04	1.08
October	.70	.03	.59	1.34	.54	3.34	2.53	2.32	1.34	1.66	2.62
November	2.73	.90	3.70	3.55	2.35	2.93	4.43	5.45	5.20	4.93	2.72
December	2.28	4.27	8.95	1.18	3.16	2.99	3.25	4.16	3.89	2.53	3.83
1930.											
January	1.22	1.86	5.78	7.25	2.35	2.73	4.51	3.74	3.96	3.98	4.14
February	4.16	2.60	3.61	1.66	3.34	2.45	2.59	3.02	3.13	1.33	2.90
March	3.49	.37	3.88	3.90	.54	1.38	3.35	3.00	4.54	1.62	1.37
TOTAL	14.95	10.20	26.56	19.30	12.66	17.63	23.65	26.16	25.54	17.24	18.83

The Bechuanaland Protectorate lies, roughly, between 2,000 and 5,000 ft. above sea level and only a few people live at the cooler altitudes of from 4,000 to 5,000 ft. The portion of the country inhabited by the greater number of both Europeans and natives is adjacent to the only line of railway, which passes through the eastern side of the Territory for a distance of 403 miles; the average altitude of the stations and sidings along this section of the line is 3,418 ft.

The approximate Latitude and Longitude of the various observation stations, taken from the latest map of the Bechuanaland Protectorate (compiled by the Geographical Section General Staff, No. 2681 of 1912) is as follows :—

	Latitude S.	Longitude E.
Ghanzi (Gemsbok Pan)	21° 41′	21° 47′
Ngamiland (Maun)	20°	23° 30′
Kasane	17° 51′	25° 13′
Francistown	21° 9′	27° 28′
Serowe	22° 23′	26° 48′
Tuli Block (Selika)	23° 1′	27° 44′
Gaberones	24° 40′	25° 50′
Kanye	24° 59′	25° 18′
Lobatsi	25° 15′	25° 38′
Molepolole	24° 28′	25° 25′
Palapye Road	22° 30′	27° 4′

The time of observation is 8.30 a.m. and in all cases where this rule cannot be complied with a note must be made to that effect.

The self-registering thermometers are protected in the shade.

The rain gauges are placed in open positions free from obstruction from surrounding objects.

At the instance of the Union Government self-recording instruments, consisting of an anemobiagraph, barograph, hermograph and hygrograph were installed at Ghanzi.